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THE EVOLUTION OF THE UNITED STATES PHARMACOPŒIA.

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With the eighth decennial revision of the United States Pharmacopœia in active preparation, it was thought that a review of some of the previous editions might prove to be of interest.

The history of the inception, origin, and continuation of the Pharmacopœia is sufficiently well told in the introductory pages of the last edition, so that we may confine these remarks exclusively to a review of the construction, arrangement, and contents of the various books.

To do this more readily and also more satisfactorily, we have computed and arranged a considerable amount of the information into tables, that, in a general way, show the contents and scope of the book at the different decennial periods.

The first edition of the Pharmacopœia is admittedly based on the "Pharmacopœia of the Massachusetts Medical Society," Boston, 1808. This work, while eight years older than "The Pharmacopœia of the New York Hospital," appears to have been much more popular, and to have enjoyed a larger circulation; consequently, had a greater following. Another reason why the "Massachusetts Pharmacopœia" was favored is found in the fact that the New England delegates to the "National Medical Convention" were sufficiently numerous and influential to practically dominate the convention. This is corroborated by the fact that the first edition of "The Phar-

macopœia of the United States," as the book was called even at that time, was printed in Boston.

This first edition had, however, several original features, in which it differed, not alone from the earlier American works, but also from any of the European Pharmacopœias that were in use in or consulted in different parts of the country.

The Materia Medica, or "Catalogue of Medicinal Substances not included in the Preparations," was divided into a primary and a secondary list. This was done so that a physician or an apothecary might tell at a glance whether or not a particular substance was much used or popular, or, as noted in one of the later editions, "it permitted a discrimination between medicines of acknowledged value and others of less estimation." The second point of difference was, that while other Pharmacopœias had either been printed in the vernacular or entirely in Latin, the body of this book was primarily in Latin, but had, on the opposite pages, a free translation of the Latin into English.

This was evidently done for several reasons: in the first place, the vernacular was introduced to make the book accessible to a number of physicians and pharmacists who were not familiar with the Latin, while the Latin was used to make the book more popular in those sections of the country where the English language was not so well understood, and also, "To make the meaning of the various directions more clear, in case the English might be considered ambiguous."

As noted above, this first volume was printed in Boston, and consisted of 272 octavo pages. If we subtract from this 101 pages of duplicated material, we would have a book of 171 pages. These pages, as is shown in the following tables, contained a total of 621 titles. Of these, 221 were in the primary and 71 in the secondary list of the Materia Medica. These two lists are described in the introduction as being "A Catalogue of Simple Medicines, together with some prepared medicines which are kept in the shop of the apothecary, but not necessarily prepared by him." Among these simple medicines we find antimonum, argentum, aurum, cuprum and plumbum; these were raw materials from which corresponding chemical compounds were to be made by the apothecary. Organic drugs, in use at the present time, were well represented in this first edition; among them we may note such familiar substances a

acacia, asafetida, benzoin, camphor, kino, lobelia, myrrh, opium and squill. Some of the English and also Latin titles are a little unfamiliar at the present time; we find, for instance, nux vomica referred to as "vomic nut," while ergot is found in the secondary list with the English title "spurred rye," sometimes called "ergot."

The portion of the book entitled Preparations includes 329 titles. As will be seen by comparing the number of articles classed under preparations in Table I with those called galenicals in Table 2, many of these so-called preparations would not be classed with preparations at the present time. This section of preparations included formulas for making chemical substances like benzoic acid, citric acid, calomel, corrosive sublimate, sulphuric ether, tartar emetic, and oxide of zinc. There were also included a large number of essential or volatile oils, with directions for producing them in the laboratory of the apothecary.

TABLE NO. I.—GIVING THE NUMBER OF TITLES IN THE FIRST SIX EDITIONS WITH THEIR CLASSIFICATIONS.

	1820	1830	1840	1850	1860	1870
Primary list	221	220	241	253	304	330
Secondary list	71	86	90	91	75	72
Preparations	329	314	357	424	494	569
Total	621	620	688	768	873	991

TABLE NO. 2.—GIVING THE COMPARATIVE NUMBER OF VEGETABLE, CHEMICAL AND ANIMAL DRUGS, ALSO THE NUMBER OF GALENICAL PREPARATIONS IN THE VARIOUS EDITIONS OF THE UNITED STATES PHARMACOPŒIA.

	1820	1830	1840	1850	1860	1870	1880	1890
Vegetable	254	260	281	297	312	321	264	255
Chemical	109	116	124	140	176	192	233	239
Animal	12	15	17	19	18	18	15	18
Galenical	246	229	266	312	367	440	481	473
General formulæ							4	5
Total	621	620	688	768	873	971	997	990

TABLE No. 3.—GIVING THE COMPARATIVE NUMBER AND CLASSES OF PREPARATIONS.

	1820	1830	1840	1850	1860	1870	1880	1890
Abstracts							11	
Cerates	11	11	9	10	16	10	8	6
Collodions				1	1	3	4	4
Confections	6	7	5	5	5	5	2	2
Decoctions	14	11	12	13	12	12	2	2
Elixirs							1	2
Emulsions								4
Extracts	16	16	24	28	32	34	32	34
Fluid Extracts				7	25	46	79	87
General Formulæ							4	5
Glycerites						5	2	6
Honeys	3	3	4	3	3	3	3	3
Infusions	23	20	27	32	31	31	5	4
Juices						2		
Liniments	9	6	6	6	7	9	10	9
Mixtures	9	5	5	6	8	8	11	4
Mucilages		1	2	2	4	4	5	4
Ointments	19	18	22	25	23	29	26	23
Oleates							2	3
Oleoresins					5	6	6	6
Papers (Chartæ)						2	3	
Pill Masses							3	3
Pills	23	13	17	18	19	19	15	15
Plasters	8	9	11	13	16	17	17	13
Powders	7	3	4	4	7	7	9	9
Pulps			3	3				
Resins					3	3	4	4
Solutions					21	26	26	24
Spirits	7	11	10	10	15	16	22	25
Suppositories						9		1
Syrups	15	14	16	19	23	23	34	32
Tinctures	51	47	56	59	56	58	73	72
Triturations							2	1
Troches	3	3	5	6	9	13	16	15
Vinegars	2	3	4	4	6	5	4	2
Washes	4							
Waters	10	8	8	9	13	15	15	19
Wines	10	9	10	10	9	9	14	10

The number and kind of galenical preparations are well illustrated in Table 3. This table also illustrates the progress or change that has been brought about in the various decennial revisions.

The general features of this first volume were retained through six editions. One interesting feature that has been developed is the fact that all of the various editions may be considered in pairs. We find, for instance, that the 1820 and 1830 Pharmacopœias have much in common, both as to contents as well as style and general appearance. Their publication was authorized directly by the "National Medical Convention," composed entirely of physicians. In 1840 the revision was delegated to a revision committee, and they in turn consulted the different Colleges of Pharmacy as to much of the detail; so that the pharmaceutical profession practically assisted in both the 1840 as well as in the 1850 editions, and these two books have also other points of similarity that we will call attention to later. In the 1860 revision of the Pharmacopœia the pharmaceutical profession practically dominated the revision committee, and the same may be said of the Pharmacopœia for 1870. The Convention for the revision of the Pharmacopœia in 1880 authorized extensive changes in the style and general make-up of the book, and these changes were retained and elaborated in the 1890 edition.

A careful study of the accompanying tables will indicate many other points of similarity between the different pairs of books. For instance, the kind and number of articles enumerated in the first two editions are almost identical. There are, however, evidences of progress. For instance, under the heading "Materia Medica" we find what the Revision Committee in the preface call "accessory matter." This accessory matter was intended to give precision to the officinal terms, and consisted, in the case of chemical substances, of a short description, and in the case of botanic drugs, of a description of the part of the plant that was intended to be used, and the designation of its botanical origin by giving the full botanical name and its author, or a reference to a book where the description of the particular plant could be found.

In the second part the descriptions or definitions of the various classes of preparations were omitted in this second edition. The reason given for this in the introduction was that "They are out of place in a Pharmacopœia which is intended for the guidance of

those already instructed in medicine and pharmacy." Among other innovations in this second volume we find iodine in the primary list, and a formula for making iodide of potassium given in the list of preparations. In this same book we also find formulas for making morphine and quinine and several of the salts of these alkaloids. Among the other interesting additions was the introduction of a colored compound spirit of lavender, and this in turn was used in the composition of the solution of potassium arsenite, thus instituting a practice that has been retained through all the various revisions to the present time.

With the 1840 edition we find a considerable change in the general appearance and also in the contents of the book. The most evident changes are, of course, the omission of the Latin portion of the work, the introduction of optional processes for using displacement filtration, or percolation, in the making of tinctures or other liquid preparations of vegetable drugs, and the introduction of better and fuller directions for making the various kinds of preparations. The improvement in this section of the book was, of course, directly due to the fact that the "National Medical Convention" had recognized the shortcomings of the previous editions, and had authorized the committee, to whom the revision of the Pharmacopœia had been delegated, to request the co-operation of the Colleges of Pharmacy in the United States. By virtue of this authority, the chairman of the committee had addressed letters to the presidents of the Colleges of Pharmacy of Boston, New York and Philadelphia, requesting their co-operation in the revision of the work. In answer to these letters the Colleges of Pharmacy of Boston and New York sent communications, proposing important changes. These changes were evidently acted upon, and the draft of the proposed new Pharmacopœia was then turned over to a committee that had been appointed by the "Philadelphia College of Pharmacy" to review it before it was turned over to the printer. The review of this P.C.P. Committee was evidently so thorough and exhaustive that it necessitated a complete re-writing of the whole book at the hands of the Revision Committee. For, as explained by this committee in apologizing for the unavoidable delay in publishing the new book, "The proposed alterations were too numerous to admit of being incorporated with the existing Pharmacopœia."

To mention a few of the new features of this edition we might

say that articles of a chemical nature had appended to them descriptions of their physical and chemical properties, with a view of facilitating their recognition, or the recognition of probable contaminations. The subject of displacement was, as noted before, introduced, and many of the formulas have two distinct processes, giving the apothecary the choice of using either the new or the old and more familiar process of maceration and subsequent filtration. This double or alternative process was probably necessary, on account of the opposition that had been encountered to the introduction of this innovation. In the call for delegates to the convention for 1850, the Colleges of Pharmacy were requested to send delegates on equal terms with Colleges of Medicine. As a result of this innovation we find that pharmacists were well represented on the revision committee that was appointed in that year. The book itself followed rather closely along the lines that had been adopted by the committee of the preceding edition. There was, however, a marked increase in the number of preparations, and quite an improvement in some of the formulas. The subject of "displacement filtration" or percolation had evidently been carefully studied and elaborated. In this edition we also find, for the first time, quite a representation of what is now a most familiar class of galenical preparations, the fluid extracts.

In 1860 another innovation was introduced. The Pharmacopœial Revision Committee, appointed by the "National Convention for revising the Pharmacopœia," recognizing that former editions had not met with the sale and use that a work of this kind should have, determined to make an effort to introduce the Pharmacopœia to a wider range of usefulness. With this object in view, and despite the fact that progress in medicine and pharmacy had necessitated the introduction of a large number of new drugs and preparations, the size of the book was materially reduced. This was accomplished by the use of smaller type and a more accurate and scientific classification of the preparations. For instance, the class of solutions was, for the first time, gathered together under one heading. The same may be said of several other preparations that in previous editions had been placed under several headings; in this edition they were all gathered together under their proper classification.

Mr. William Procter, Jr., it appears, was the guiding genius in

this attempt at popularizing the Pharmacopœia. Among other things he induced the publishers to materially reduce their expected profits, and this, with the reduction in the size of the book, enabled the publishers to offer it for sale at the remarkably low price of one dollar a copy. While actual figures are not obtainable, there can be no doubt that this and the one immediately succeeding were the two most popular and most widely used of any of the editions of the United States Pharmacopœias.

The edition of 1870 retained many of the features of the fourth decennial revision, and despite the fact that the price was materially increased it still remained a popular book. This popularity is evidenced by the fact that for years after it had gone out of date it was still on sale through the usual channels, and even to-day it may be found on the shelves of many pharmacies among the books that are consulted and used in the everyday work of the dispensing counter or laboratory.

The revolution that was wrought in the make-up of the Pharmacopœia by the Revision Committee for 1880 is of comparatively modern date. This was really the first book that made any pretentions to be in line with advanced work and ideas. The old classification into a primary and secondary list of materia medica, and a separate list for preparations, was abandoned, and in its place we find an alphabetical arrangement of all drugs and preparations. While many of the old and practically useless drugs had been dropped, there still remained a goodly number of little used or obsolete drugs. Many of you will remember how the majority of the reviewers of the day, following in the footsteps of the late and much lamented Dr. E. R. Squibb, called attention to the unpopularity of the first or opening title in the book, Absinthium. This book, however, had many excellent features, and we can here call attention to but a few of them.

The descriptions of the crude drugs were elaborated so as to include structural peculiarities that could be made out with a pocket lens having a magnifying power of ten diameters. All of the chemicals had tests for their identity or purity added, and many of them had added volumetric estimations of allowable impurities. In addition to this, reliable assay processes were given for at least two of the alkaloidal drugs.

The exclusive use of the apothecaries' system of weights and

measures was abolished, and instead, by way of a compromise, the formulas were given in parts by weight, with the notable exception of those where definite quantities were called for, and here the metric weights were given with, and as an alternative for, troy or apothecaries' weights. This book then marked the definite introduction of the metric system of weights and measures into the practice of pharmacy in the United States. Altogether it was a creditable and highly scientific production, and one that will prove to be a landmark in the advance of pharmacy.

The unfortunate feature of this edition was the price at which the book was to be sold. That this was a mistake, and one that was recognized and not sanctioned by a large number of the members of the Revision Committee, is evidenced by the tone of an editorial in the AMERICAN JOURNAL OF PHARMACY (1882, p. 636). In this editorial the writer called attention to the high-handed action of the sub-committee on publication, and disclaimed any sympathy with the impending contract for publishing the Pharmacopœia.

The direct result of this peculiar action, of course, was that the book was not popular with the great majority of pharmacists. It found its way into the shops of but a comparatively few of the more advanced and more progressive members of the profession. Probably the most interesting feature in this connection is the fact that the individuals and interests against whom the blow was directed really benefited very materially by the change. This is, however, a subject that is hardly in keeping with the intentions of this particular paper; suffice it to say, therefore, that as a working manual the Pharmacopœia was largely displaced by one or the other of the various commentaries or works of that kind.

The 1890 edition, while following the lines that had been mapped out by the previous Revision Committee, included some radical changes. Among these was the abolition of the parts by weight, and the complete adoption of the metric system of weights and measures. In addition to this, many of the obsolete or useless drugs and preparations were discarded, and a higher standard of purity was required for those retained. These requirements, in many cases, have been considered too high, and it is true that in some instances a theoretical degree of purity was demanded that was difficult if not impracticable to obtain in practice.

This last edition of the Pharmacopœia, while not as popular as it

should have been, has nevertheless reached a much greater number of active pharmacists than the previous edition. All of this despite the fact that the 1880 edition directed the attention of the majority of these pharmacists to the evident advantages of the dispensatories and commentaries that were and are allowed to publish at will complete or modified working formulas for the different preparations. It must therefore be considered a promising indication for the future that a gradually increasing number of pharmacists are again making their preparations from, and comparing their crude drugs and chemicals to, the clear and graphic formulas and descriptions as given in the Pharmacopœia itself.

It will readily be admitted that the book from which the everyday work of the pharmacist is conducted should not be overburdened with foreign matter. The formulas should be clear and distinct and not given in duplicate or triplicate, as is the case with some as given in the dispensatories.

This brief review of the past editions will of course suggest speculation as to the merits and contents of the coming.

That the coming book will be a marked step in advance, and practically inaugurate a new era in professional pharmacy, is to be expected. That we have a right to expect this is evidenced, not alone by the indications from the past, but is already assured by the action and recommendations of the last convention. As is well known, this convention has authorized certain changes that will give the book a firmer and more authoritative position with the rank and file of both the medical and the pharmaceutical professions.

That the coming book will prove to be the equal if not superior of any of the recent editions of several of the European Pharmacopœias, is assured by the scientific character and attainments of the various members of the Pharmacopœial Revision Committee. That the new book will have exceptional merits is doubly assured by the established standards that it must at least equal, if not excel.

Whether or not it will become a popular book will depend largely on the action of the Committee on Publication, and mainly on the price at which it is to be sold. Let us hope that, for the sake of advancing the interests of scientific pharmacy in these United States, this committee may see its way clear to publish, not only a

scientific book, one that the present and also future generations of pharmacists may point to with pardonable pride, as depicting the sum total of our present knowledge, but, what is also to be desired, let us hope that the committee on publication sees its way clear to have the book issued in such shape that it will find its way into every shop where drugs and medicines are either sold or prepared. Let us hope that they will issue a book that will always lay open before the working pharmacist and be to him a guide and a reference in his daily work; a book that he will learn to cherish on account of the information that it contains; one that he will follow because its formulas are not alone simple and concise, but will, without unnecessary care, give preparations that compare favorably in appearance and efficiency with any that can be produced by the manufacturing pharmacists. In short, let us hope that the present Revision Committee can give us a book that is good enough and cheap enough to appeal to the physician as a source of information, to the student as a necessary text-book, and to the apothecary as a manual and guide in his everyday work.

THE U.S.P. DESCRIPTIONS OF CRUDE DRUGS.

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If we attempt to compare the crude drugs, of vegetable origin, as they are found in the pharmacies of to-day, with the descriptions of them as given in the last edition of the U.S.P., we will find that these descriptions do not describe the drugs as they are found in the ordinary channels of trade.

This discrepancy is of course due to the fact that, at the present time, many of these drugs are bought and sold as compressed herbs, or if the substances are to be used in the making of galenical preparations, they are usually bought in a comminuted, ground or powdered condition. This change in the physical characteristics of these various vegetable substances would appear to make it imperative that the coming Pharmacopœia include descriptions and tests by means of which these drugs, as they are actually found on the shelves of the retail pharmacist, may be readily recognized, and any probable adulterations or sophistications detected.

For this particular purpose the compound microscope offers a

means of establishing a series of tests that are easily applied, and are at least as reliable, or perhaps even more so, than a desultory examination of the macroscopic appearance of the whole drug.

To illustrate this point more fully, let us consider the descriptions and usual appearance of half a dozen of the more popular drugs as they occur in the trade.

Few pharmacists ever buy the seeds of Strychnos Nux-vomica, as they are described in the Pharmacopœia, and this for the simple reason that the drug miller, with steam-driven machinery, can comminute these tough horn-like bodies in a fraction of the time and at infinitely less cost than could the pharmacist with his historic but mechanically inefficient pestle and mortar. It is evident, therefore, that the only portion of the really excellent description of nux vomica given in the Pharmacopœia that is at all applicable to the drug, as usually bought by the pharmacist, is that "it is inodorous and persistently bitter." While it is true that under extract of nux vomica we have an assay process that is applicable to the drug itself, this process, however, does not give any method of differentiating strychnine from brucine or any other alkaloid that may be present. In this particular case it would appear desirable, then, that the Pharmacopœia include a definition of the color and microscopical appearance of this drug in the comminuted state, and also an enumeration of the kind of plant hairs and cells that may be recognized by means of the microscope. In addition to this it would appear desirable to introduce a test for definitely estimating the amount of strychnine present, and of differentiating this from any probable contaminating alkaloid.

Cinchona is another one of the drugs that are seldom bought in the whole or unground condition. This fact has already been recognized by the Revision Committee of the last Pharmacopœia, as under cinchona as well as under cinchona rubra we find a definition of the proper color of these drugs in their powdered form. We also find quite a reliable method of recognizing quinine and of estimating it apart from the estimation for total alkaloids.

For cinchona, then, it would only be necessary to add a description of the kinds of cells and cell contents that may be found, and possibly an enumeration of the kinds of cells that should not be present.

The chemistry of ipecac has been inquired into so thoroughly

during the past two or three years, that a method of assay for total alkaloids at least might be introduced. In addition to this a description of the color of the ground or powdered drug, with the chief cell characteristics, might be added.

Here it may be interesting to note some of the difficulties that will necessarily be encountered in developing satisfactory tests or descriptions for the various constituents and different appearances of powdered drugs. As is well known, the German Pharmacopœia, in its last revision, recognized the fact that many crude drugs are being marketed in a ground or powdered form, and has given quite a number of very satisfactory and reliable descriptions of the various powders. Among others it includes a description of the powder of ipecac. It appears, however, that the description strictly applies to the root of Brazilian origin; so that, despite the fact that chemical as well as physiologial investigations have demonstrated that the Carthagena root is in many respects quite as efficient and even conforms with the chemical requirements of the German Pharmacopœia, it is nevertheless barred from use in Germany on account of the reputed difference in the size of its starch grains.

Apart from any question of whether or not it is necessary or desirable to admit the Carthagena ipecac on the same terms as the Brazilian root, this particular incident only illustrates the fact that we cannot possibly expect to have a series of descriptions that will prove to be perfect for an indefinite length of time, for, as has been repeatedly pointed out, it is only by making mistakes and subsequently discovering them that we can possibly expect to make progress in any vocation or science.

Belladonna leaves are certainly never seen in trade as herbarium specimens, so that at least the first half of the U.S.P. description would not be applicable to their identification, as they usually occur in the shops. In addition to the remaining portion of the description we should have an enumeration of characteristic cell formations that may be found and also a method of assay for the alkaloid.

Rhubarb belongs to a class of drugs for which we cannot, at the present time at least, expect to have a satisfactory chemical standard. We have, however, several qualitative tests, and also several distinct cell constituents and cell forms; these should be enumerated in the official description.

Practically the same is true of squill; here, again, a quantitative

chemical estimation is out of question, and only qualitative tests and the microscopical appearance of cells and the cell contents are available, by means of which we may recognize this drug or any of its possible adulterations.

These six drugs, picked at random from those contained in the Pharmacopœia, illustrate very well the needs and shortcomings of the present descriptions of vegetable drugs. What is true of these is true of almost every one of the organic drugs used or sold in the apothecaries' shop at the present time.

While the present Revision Committee has, no doubt, given considerable time and thought to a consideration of the needs and necessities of the coming edition of the Pharmacopœia, and has also considered the advisability of including descriptions of powdered drugs, its members will hardly be willing to make any radical innovations, however, unless they feel that these changes are needed and desired by a fair majority of the people for whom the Pharmacopœia is intended. Therefore, it remains for the individual pharmacist to recognize the importance and the necessity of his being able and willing to take advantage of any possible chance of improving the professional side of his calling, unless, of course, he is willing to degenerate more and more into being a vendor of somebody else's pharmaceutical specialties and other so-called patent medicines.

The Pharmacopœial Revision Committee will, no doubt, give us the kind of book we ask for. The members composing that committee are not alone eminently practical, but they are also scientifically able to give us a book that will compare favorably with any that has been published in Europe during the past five years, and it is quite safe to say that they are willing to incorporate the most desirable and practical information in the coming edition of the United States Pharmacopœia.

What should be done, however, is that the rank and file of the pharmaceutical profession recognize the necessity of making scientific progress and demonstrate their willingness to adopt and to further elaborate any improvements in their official standard. A step in the right direction will be taken if, at the coming meetings of local, state or national associations, the members of the pharmaceutical profession will declare their willingness to adopt a pharmacopœia that will include reliable and up-to-date tests for articles of

the organic materia medica as they occur in the ordinary channels of trade at the present time.

A PRACTICAL METHOD OF PREPARING A HEMATIN PRODUCT.

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I. INTRODUCTORY.

The comparative value of "inorganic" and "organic" iron preparations is still under discussion. It is not my purpose to enter into this question, but I take it for established that experimenters and the majority of clinicians acknowledge that organic iron preparations are indicated in certain conditions. Iron in the organic form—*i. e.*, combined in such a way that it cannot be demonstrated directly by chemical reactions—differs entirely in its therapeutic properties from the ordinary "inorganic" iron salts. It cannot be produced synthetically, any more than proteid-nitrogen can be produced from ammonia or nitrates. Preparations containing it can only be isolated from cells, either vegetable or animal. Typical of preparations of the former class are the nucleins; of the latter, the hemoglobin derivatives. The origin of the organic iron does not seem to be an important feature in its therapeutic action; so that the cost of the preparation and the pharmaceutic elegance of the product are the principal features which will determine the choice of a useful compound.

As a raw material for the manufacture of an organic iron, blood has certainly the advantage of a low prime cost. Raw defibrinated blood, however, is justly repellent to the æsthetic taste of most patients; and this holds, although to a less extent, for blood which has been simply dried or preserved with glycerin. This objectionable feature can be very largely removed by isolating the hemoglobin or one of its modifications. The dose is in this way reduced, the sanguinous character is disguised, and the raw animal flavor is entirely destroyed. To secure this end for medicinal purposes it is not necessary that the product should be entirely free from foreign substances, as long as the latter are reduced to a small amount and are of a harmless character.

The only reason why preparations of this kind have not become popular is to be found in their prohibitive price, due to the expense and to the small yield of the present processes of manufacture. The only products which come within the range of practicability are reduction-derivatives: hemogallol, prepared by the action of pyrogallol; and hemol, prepared by the action of zinc. These are rather further removed from hemoglobin than is desirable; there is always some danger of contamination with the chemicals used in their manufacture; the processes are not such as can be readily employed in the average pharmacy; and the cost of the preparations is still very high, especially when the effective dose is considered.

II. PRELIMINARY EXPERIMENTS.

The problem which I set before myself was, therefore, to devise a process yielding a physiological hemoglobin derivative, by a method requiring only simple manipulations and apparatus, and which should still give a permanent product sufficiently pure for medicinal use, at a minimum cost. It is known that hemoglobin, taken by the mouth, is changed to hematin before absorption. This derivative was, therefore, the one which I aimed to isolate.

Hemoglobin and its derivatives are proteids, and agree closely with the other serum proteids in their physical and chemical characters. The precipitability and solubility are nearly the same, and hence arise the difficulties in isolating a pure hemoglobin product. A difference exists in the behavior to acidified alcohol and ether. Hematin is somewhat soluble in these media, whereas the other serum proteids are insoluble. This is the basis of the processes so far employed for the isolation of these products, and my first experiments were made along this line. On account of the very limited solubility of the hematin, the yield was so small, considering the large loss of the expensive solvents and the tediousness of the process, that the cost of the product would render it useless.

After some further experimentation it occurred to me that an efficient separation might be secured very cheaply by peptic or other digestion. Peptic digestion (in an acid medium) converts the serum proteids first into acid-albumins, then into albumoses, whilst hemoglobin is changed to acid-hematin. When the liquid is rendered neutral the acid-albumin and acid-hematin are precipitated, whereas the albumose remains in solution. It would therefore only be neces-

sary to carry the digestion so far as to convert all the acid-hematin into albumose, to obtain a precipitate of pure hematin on neutralization. This method, which I first tried myself, and then had controlled by one of my students, Mr. S. A. Young, gave eminently satisfactory results. I shall give the process in detail. We operated on quantities of 100 c.c. to 1,000 c.c. of blood at a time.

III. PROCESS FOR THE ISOLATION OF THE HEMATIN.

Material required:

Defibrinated Beef's Blood[1]	1,000 c.c.
Pepsin, U.S.P.	1·5 gm.
Dilute Hydrochloric Acid, U.S.P.	Of each a sufficient
T. S. Sodium Carbonate, U.S.P.	quantity to make
Thymol	18 to 30 gms. of hematin.

(1) To the blood add 2,000 c.c. of dilute hydrochloric acid and 0·5 gm. of pepsin. Pour into large bottles, which should be a fourth filled. Add to each bottle a small crystal of thymol (the size of a split pea) and set the bottles in a large water-bath (a wash-boiler will answer the purpose), which is kept at a temperature of 40° C., for twenty-four to thirty-six hours.

(2) Render the contents of the bottles just neutral to litmus by the sodium carbonate solution. Fill the bottles with cold water and let them stand in a cool place until the precipitate has settled.

(3) Carefully decant the supernatant liquid, leaving the precipitate and adhering liquid in the bottles. Again fill the bottles with water, let settle, and decant. To the washed and moist precipitate in the bottles add now enough of a mixture of

40· c.c. of diluted hydrochloric acid,
0·5 gm. of pepsin,
960· c.c. of water,

to a third fill the bottles; add to each a small crystal of thymol, and digest at 40° C. for twenty-four hours. Then proceed by (2) (above). Decant a little of the clear liquid into a test-tube, and add an equal volume of soda solution and a drop of T. S. cupric sulphate. If this produces a pink color, repeat (3) (above). If the color is blue, proceed by the next paragraph.

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[1] Blood which has been rendered non-coagulable by removing the fibrin. This is done by stirring the blood vigorously with a rough wooden stick for some ten minutes, beginning immediately after it has been drawn from the animal.

(4) Decant the liquid from the precipitate as completely as possible. Fill the bottles containing the moist precipitate with cold water, let settle, decant, and repeat this until the washings give only a faint turbidity with acidulated T. S. silver nitrate. When this stage has been reached, pour the precipitates into a large evaporating dish and dry on a boiling water-bath. Pulverize the product in a wedgewood or porcelain mortar.

IV. YIELD AND CHARACTERS OF THE PRODUCT.

On account of the low cost of the materials, the absolute yield is of little importance. We have found it to vary from 1·8 to 3 per cent. of the defibrinated blood, according to the care used in neutralizing and in decanting.

The product constitutes a black, granular powder, non-hygroscopic, odorless, and practically tasteless. Mixed with sugar or chocolate, it constitutes a very palatable confection.

It dissolves slowly in 1 per cent. Na_2CO_3 and in 0·2 per cent. HCl; less readily in 1 per cent. HCl. The solutions are turbid, reddish brown, and give the characteristic hematin spectra. The solution is hastened by heating. The solubility is not impaired by boiling the solutions or by heating the dry powder for twenty-four hours at 100° C. Strong NaOH yields a clear dichroic solution, which does not give the biuret test for proteids. The hydrochloric solutions do not give the Prussian-blue reaction with ferrocyanide, showing the absence of inorganic iron.

The ash of the product varies, of course, with the care with which it has been washed. In the sample made by Mr. Young it was 9·2 per cent.; in one made by myself, 5 per cent. Dried at 110° C. to constant weight, the former sample lost 5·57 per cent. of water.

The determination of the ash, moisture and iron were made by Dr. R. A. Hatcher. I take this opportunity to thank him for his willing assistance.

V. IRON-CONTENT.

Two different samples were each found to contain 0·7 per cent. Fe. Nencki and Sieber's formula for hematin ($C_{32}H_{32}N_4O_4Fe$) corresponds to 9·3 per cent. Fe. It follows from this that my product is far from being pure hematin. Nevertheless, its iron-content compares very favorably with that of other iron products. Even pure hemoglobin contains but 0·4 per cent. Fe (Hüfner).

VI. ADMINISTRATION.

As I have stated, the product is entirely unobjectionable to sight, taste or smell. It is absolutely non-irritant when taken by the mouth. It should be administered in solid form, either as powder mixed with two parts of sugar, or as chocolate tablets. The dose, as with other preparations of this class, would be about 1 gm. per day.

EXTRACTION APPARATUS FOR THE EXHAUSTION OF WATERY LIQUIDS BY IMMISCIBLE VOLATILE SOLVENTS.

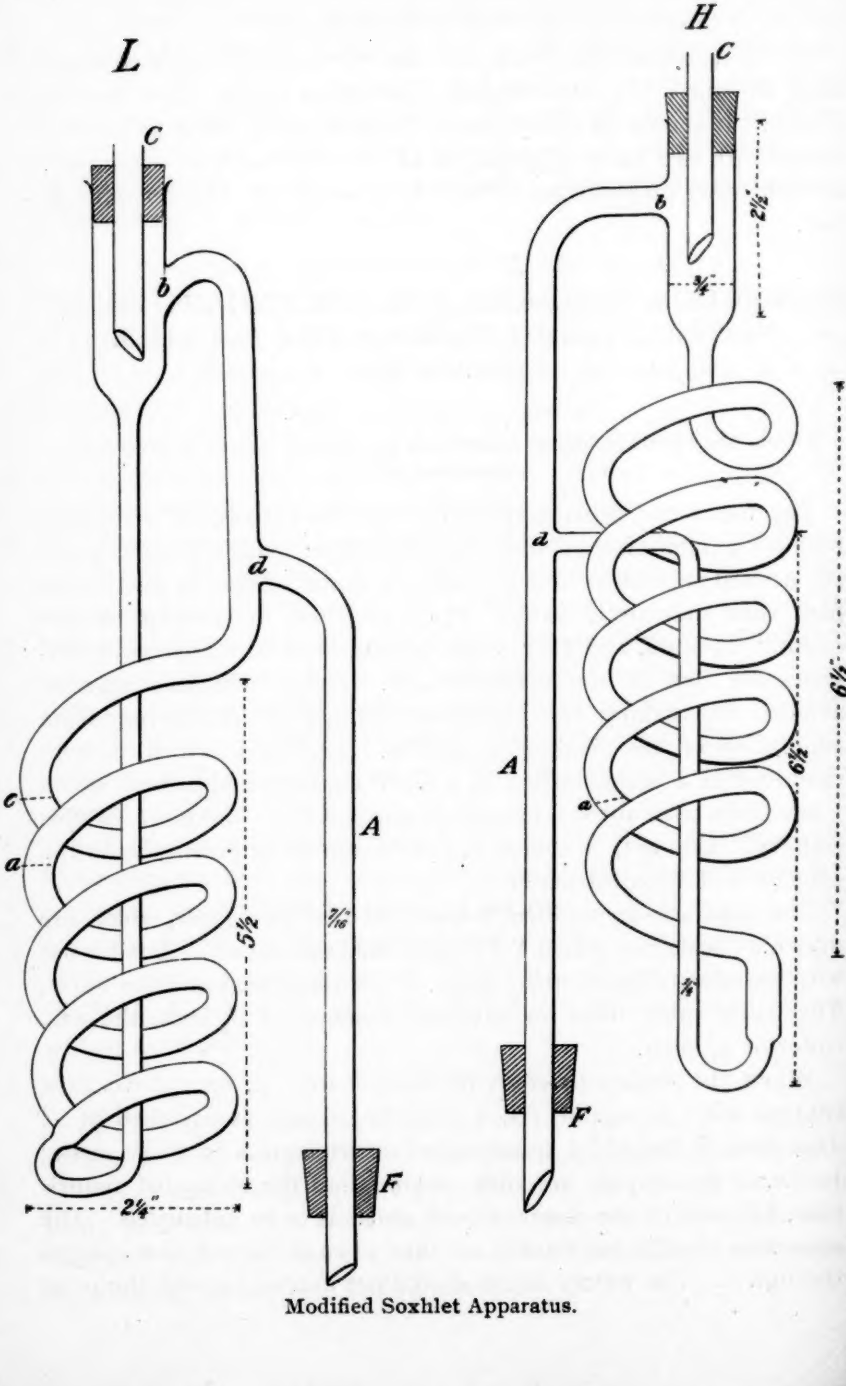
By Torald Sollmann, M.D.

(From the Pharmacological Laboratory of Western Reserve University, Cleveland, O.)

The use of the separatory funnel for the exhaustion of watery liquids by immiscible solvents has some objectionable features when the desired substances are but slightly more soluble in the extrahent than they are in water. The extraction must then be frequently repeated, and very large quantities of the expensive solvents are lost in the manipulations. These difficulties may be avoided by making the extraction continuous, employing some adaptation of the Soxhlet apparatus. The form which is here described is a simplification of a more expensive apparatus which I have seen used abroad, but which appears to be unknown in this country. I do not, of course, lay any claim to originality as to the principles of its construction.

The apparatus as modified is illustrated in the figures, which are drawn to scale and which are largely self-explanatory. *L* is for use with extrahents lighter than water, *H* for those heavier than water. The wider tubes have an external diameter of $\frac{7}{16}$ inch, the narrower of ¼ inch.

When the apparatus is to be used, a 100 c.c. or 250 c.c. flask charged with 30 c.c. or 100 c.c. of the solvent is attached at *F*. This flask is tared if a quantitative determination is to be made; 10 c.c. of the solvent are then poured into the expanded funnel-tube, followed by the watery liquid which is to be exhausted. The apparatus should be slanted so that none of the solution escapes through *b*. The watery liquid should not extend beyond the point



Modified Soxhlet Apparatus.

a in the cut—*i. e.*, for the given dimensions it should not exceed 25 c.c. The flask is now set on a water bath and the funnel-tube is attached at *C* to a reflux condenser, properly supported. When heat is now applied to the water bath, the vapors generated in the flask escape through *A*, are liquefied in the condenser, and drop back into the funnel.

With light solvents, using apparatus *L*, the solvent displaces the water from the narrow tube, driving it toward *c*. As soon as enough of the solvent has accumulated to extend beyond the bend at the lower end of this tube, it will ascend in bubbles through the solution contained in the coils, and will be discharged through *d* back into the flask. From here it will repeat the circuit. If the heat is properly regulated, the apparatus will functionate perfectly automatically, and may be left to itself until the solution is entirely exhausted.

When the apparatus *H* is used for extrahents heavier than water the solvent descends in bubbles through the solution in the coils, ascends through the narrow tube and flows back into the flask through *d*. In other respects the apparatus functionates precisely like *L*. If the apparatus should break it can usually be readily joined by rubber tubing.

The extractors which I am using were made after my directions by E. Machlett & Sons, 143 East Twenty-third Street, New York, at a cost of $3 for the pair.

A WAY OF RESTORING BROKEN SOXHLET APPARATUS TO USEFULNESS.

By Torald Sollmann, M.D.

Every one who has had occasion to work with Soxhlet extractors has doubtless been greatly annoyed by the fragility of this apparatus. The fracture occurs almost invariably at the point *a* (*Fig. 1*), precisely where it is impossible to repair, and the apparatus is rendered absolutely useless. The description of a simplified extractor published by L. D. Haverhill (*Drug. Circ.*, Vol. 46, p. 193) suggested to me a way of restoring such broken apparatus to some degree of usefulness, as follows:

The tube *b* (*Fig. 2*) is cut off smooth at the broken point. The tube *c* is closed by a small blowpipe flame, as close as convenient to

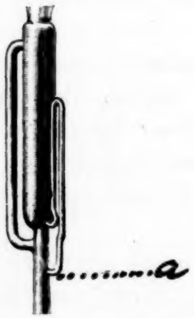


FIG. 1.—Soxhlet Apparatus.

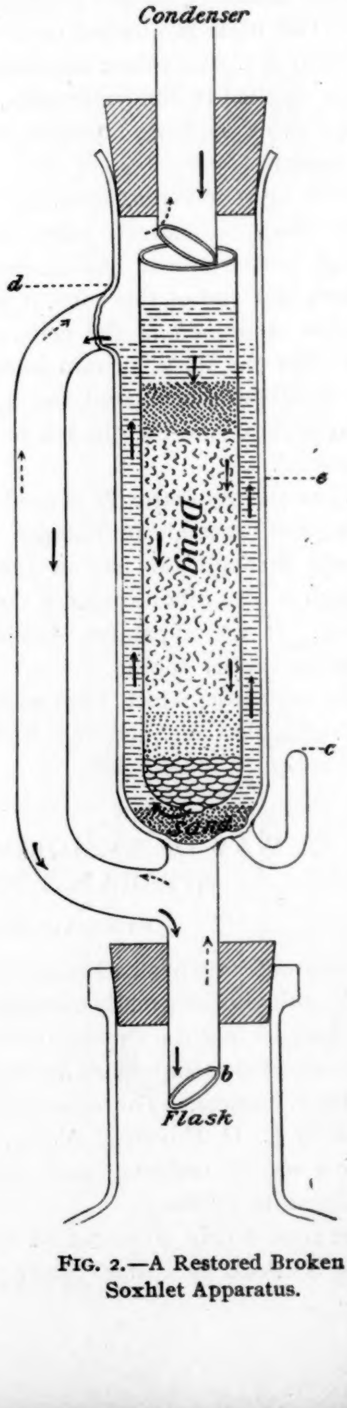


FIG. 2.—A Restored Broken Soxhlet Apparatus.

the body of the extractor. A strong test-tube is chosen, of such diameter that it will fit loosely into the tube *e*, and will reach above *d*. If no test-tube of sufficient length is at hand, the lower part of *e* may be filled with sufficient clean sand. A hole is now made in the bottom of the test-tube by heating the very end in a blowpipe flame whilst blowing into the tube. The apparatus is now ready for use. A loose plug of purified cotton is packed loosely into the bottom of the test-tube, on this is placed a layer of clean sand, then the powder to be exhausted, and another layer of clean sand. The apparatus is then mounted as in *Fig. 2*, and used as the ordinary Soxhlet extractor, the solvent taking the course indicated by the arrows.

THE EFFECT OF COLLOIDS IN DIMINISHING THE TOXICITY OF STRYCHNINE.

By Robert A. Hatcher, M.D.,
Demonstrator of Pharmacology, Western Reserve University.

Upon the suggestion of Professor Sollmann, an investigation was undertaken with a view to learning by life-tests whether strychnine is destroyed in the tissues or not, and what influence certain conditions may have upon this destruction. This investigation is still in progress and will be the subject of a separate article, the present contribution being deemed of pharmaceutical as well as pharmacological interest.

In a series of sixty-two experiments upon frogs and nine upon guinea-pigs, the minimum fatal dose of strychnine sulphate, hypodermically injected, was found to be 0·0042 mg. × G.,[1] while 0·0045 mg. × G. invariably proved fatal, and 0·00435 mg. × G. was fatal to three out of five. They usually became spasmodic in from three to eight minutes.

The average fatal dose for guinea-pigs was found to be 0·00475 mg. × G.; this dose and all above were fatal, while all receiving less recovered. In this connection it is interesting to note that the dose necessary to cause convulsions in the guinea-pig is within 10 per cent. of the fatal dose, less quantities merely producing hyperexcitability, whereas in the frog, the smallest doses given—about 30 per cent. below the fatal dose—rendered them spasmodic.

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[1] 0·0042 mg. × G. = 0·0042 milligrammes multiplied by the weight of the frog in grammes.

Ten mg. quantities of strychnine sulphate, having been injected into the tissues of rabbits and guinea-pigs respectively and extracted, was then injected into frogs and guinea-pigs in doses which were calculated upon the supposition that the whole of the 10 milligrammes was recovered, none being lost or destroyed in the tissues. Having noticed the absence of bitterness in the solution of extracted strychnine and, further, that the amounts theoretically present did not prove fatal in the usually fatal dose, while the convulsive action was considerably delayed, it was suspected that the colloid matter present was responsible for the diminished toxicity.

Calculating the dose of strychnine sulphate extracted from the tissues from the amount injected, and supposing none to have been lost or destroyed, a dose of 0·0084 mg. $\times$ G. was survived by a frog, but to another 0·0086 mg. $\times$ G. was fatal. This solution of strychnine sulphate, after repeated purification, proved fatal to one frog in the dose of 0·0065 mg. $\times$ G., while another survived a like quantity.

In order to test the influence of colloids upon the toxicity of strychnine more accurately, strychnine sulphate was suspended in oil and in this way 0·006 mg. $\times$ G. hypodermically proved fatal to a frog in 12 hours, evidently very near the minimum fatal quantity when so used, since toxic doses usually kill in about an hour.

The strychnine sulphate was then dissolved in thin mucilage of acacia and 0·0055 mg. $\times$ G. was injected into a frog; the tetanus was delayed an hour, and recovery followed; 0·0065 mg. $\times$ G., similarly employed, was fatal, but upon repeating the experiment, but using thick mucilage of acacia, recovery followed, though this dose exceeded the quantity fatal in ordinary solution by nearly 50 per cent.

In a guinea-pig 0·00495 mg. $\times$ G. in thin mucilage caused convulsions in twenty minutes, followed by recovery; and upon repeating this experiment upon another guinea-pig, but using thick mucilage and finding no convulsive effect, the dose was increased to 0·0054 mg. $\times$ G., using thick mucilage again; this also failed to produce any noticeable effect even after some hours, the animal dying later of bacterial poison.

From the results of these experiments it will be seen that the presence of colloidal substances diminishes the toxicity of alkaloidal poisons injected hypodermically as they do when given by the mouth.

Schmiedeberg states (*Arzneimittellehre*, p. 190) that one may take it with enough certainty that all indigestible colloidal substances, to wit, gums and mucilage of plants, not only themselves remain longer in the stomach and intestine, but also delay the absorption of other substances, and E. Leibert (reported by H. v. Tappeiner, *Archives internationales de Pharmacodynamie et de Thérapie*, Vol. 10, p. 85, 1902) showed that colloids markedly hinder the effects of dilute solution of chloral hydrate, and Rott (*ibid.*, p. 93) showed that this difference existed also, with or without gums, when the solution of chloral hydrate was introduced into the intestines.

CLEVELAND, O., May 7, 1902.

THE NEW CONTACT METHOD FOR THE MANUFACTURE OF SULPHURIC ACID.

By Prof. Samuel P. Sadtler.

The importance of sulphuric acid as the foundation of most chemical industries is generally impressed upon every chemical student. His attention is called to the fact that all the other mineral acids are obtained by its aid from the minerals or salts in which they are bound up in nature and that many of the elements are also obtained by reactions in which its use is found to be indispensable. It is to be remembered, too, that some of the most important organic products are only obtainable by the aid of the concentrated or fuming sulphuric acid, as alizarine and artificial indigo. The question of its manufacture on a large scale cheaply becomes therefore of the first importance.

The chemical reaction underlying its production is an extraordinarily simple one. It merely involves the union of sulphur dioxide with an atom of oxygen to form sulphur trioxide, and this takes up moisture with avidity to form the molecule of sulphuric acid. While this reaction of sulphur dioxide and oxygen is an exothermic one, it takes place very slowly, unless aided by some catalytic-acting material. In the well-known lead-chamber process, this material acting as the carrier of oxygen is a mixture of the oxides of nitrogen, obtained by the decomposition of nitric acid or a nitrate. This process, after having served for over a century as the only one capable of being used on a manufacturing scale, is likely to be replaced in the near future by what seems to be a simpler one,

although there is no difference in the fundamental chemical reaction. It merely replaces the gaseous carrier of oxygen by the use of a solid contact material, which by its catalytic action brings about the same change of sulphur dioxide to sulphur trioxide. There is this advantage, however, that these contact substances, acting at a higher temperature, can bring about the change in the absence of water and thus produce at once a stronger acid than chamber acid, or even sulphuric anhydride itself as a direct product.

In an address before the German Chemical Society, delivered October 19, 1901, and printed in full in the *Berichte der Deutschen Chemischen Gesellschaft*, 34, p. 4069, Dr. R. Knietsch, of the Badische Anilin- und Soda-Fabrik, gives an account of the manufacture of sulphuric acid by the new "Contact Method" as developed and patented by his company and now manufactured by them on a large scale. As this is the first detailed account of the new process, now being largely adopted by the manufacturers of sulphuric anhydride, and promising to replace the time-honored lead-chamber process for all grades of sulphuric acid, wherever new plants are being designed, it will be well to give its substance for general information.

The first discovery of the catalytic action of a solid body in the formation of sulphuric acid was made by Peregrine Philips, Jr., of Bristol, Eng., who took out a patent for the use of platinum in this connection. Seventeen years later, Schneider, a Belgian chemist, announced the catalytic action of pumice stone and thought that he had solved the problem of the ready formation of sulphuric oxide by its means, but the promise was not realized. In 1846, Jullion patented the use of platinized asbestos as a catalytic agent, but it was not used in connection with the manufacture of sulphuric acid until later.

Wöhler and Mahla later discovered the catalytic action of the oxides of copper, iron and chromium, but the discovery did not lead to any practical process.

The next step in advance was made by Clemens Winkler, who used an exact mixture of two volumes of sulphur dioxide and one volume of oxygen to form the trioxide, which could then be combined with much or little water, according to the strength of acid desired. This method was successfully applied to the manufacture of fuming sulphuric acid. For this purpose he heated ordinary sulphuric acid, which on decomposing formed water, oxygen and

sulphur dioxide, and condensed the water. The oxygen and sulphur dioxide, in the presence of the contact mass, then united to form sulphur trioxide. It was, however, not considered possible to use furnace gases direct, and for the manufacture of dilute acid it could not of course compete with the chamber process.

The Badische Anilin and Soda Fabrik, however, took up the effort to carry out the reaction, utilizing the sulphur furnace gases, and found that the dilution of these gases with nitrogen, contrary to Winkler's view, did not interfere with the reaction. They found that the presence of small quantities of solid impurities in the gases did interfere and hence the mixed gases had to be led through cooling and condensing tubes for quite a distance before allowing them to pass over the contact mass. In fact the greatest care had to be taken to eliminate a variety of impurities, which if present speedily rendered the contact mass inactive.

An examination of the furnace gases showed that, while the action on the contact mass was due partly to the presence of antimony, bismuth, lead, zinc and other substances in small quantities, the most injurious substance was arsenic, which was able, when present only to the extent of 1 to 2 per cent., to poison the mass and render it entirely inactive. The removal of the small amount of arsenic trioxide present in the gases as a mist was a problem which had been studied by many chemists, but had never been successfully solved.

After the expenditure of an immense amount of time, patience and money a method was devised by which, through cooling and washing and other processes, the exact details of which are not given, the gases were absolutely freed of all impurities, especially those in the solid condition. It was found that the ease with which the solid particles could be precipitated depended largely upon the rate of cooling, slow cooling greatly facilitating it. Although it was supposed that acid of a concentration of 90 per cent. could not act on iron, or, if so, would form sulphur dioxide, the decrease in power of the contact mass, which only began to appear after weeks or months, was shown to be due to the formation of hydrogen from the iron and sulphuric acid and the action of this on an arsenic compound to form arsine. Even the trace of arsenic contained in the small amount of sulphur, which passed through unprecipitated, was sufficient to injure the contact mass. But this was easily

removed, as was also the sulphuric acid which was formed in the furnace and which before had acted on the iron and the arsenic compounds by spraying the gases after they issued from the furnace where the pyrite was burned.

In the technical preparation of the fuming acid very little attention had been paid to the heat evolved when sulphur dioxide and oxygen combine, although it amounted to 22,600 calories. It was shown that the commonly accepted idea of the necessity of heating the contact mass very high, in order to produce the combination when the diluted furnace gases were used, was incorrect, and that both the yield and the life of the mass could be increased if the tubes containing it were cooled in order to carry off some of the heat generated in the chemical combination of the two gases. A form of furnace was devised, something like a tubular boiler placed on end, and the contact mass arranged in the upright tubes of the furnace in such a way that the pressure and amount of surface of the mass exposed in each tube was the same. Under these conditions the process is a continuous one and the mass retains its full power for a year or more.

The ordinary method of absorbing gases by passing through a series of vessels containing water or dilute acid would not entirely remove the sulphur trioxide even when a number of the absorbing flasks were used; but one vessel containing acid of 97 per cent. to 98 per cent. sulphuric acid absorbs it instantly and entirely.

In order to keep the concentration at this point the excess of sulphur trioxide is removed from time to time or water is added. By the method just described the experimenters were able to obtain acid of any concentration and mixtures of the acid and sulphur trioxide in all proportions.

Although the amount of product formed is not directly dependent upon the nature of the contact mass, yet the latter must be one which will give the greatest efficiency at about 450° C. All substances which reach their highest efficiency above this temperature will never cause a quantitative yield, no matter how long the gases may be kept in contact, as they will be partly regenerated if they have first combined. The only substance which fulfils these conditions is platinum, even members of the same family not showing an equal efficiency. The introduction of this method has enabled the Badische Anilin- und Soda-Fabrik to increase the yield of the anhydride from 18,500 tons in 1888 to 116,000 tons in 1900.

The incentive to the development of this practical contact process was the need of anhydrous or fuming sulphuric acid for the cheaper manufacture of organic products like alizarine, and especially the new synthetic indigo, but the process now developed is able to compete advantageously with the chamber process for all grades of sulphuric acid, and the close of the nineteenth century undoubtedly sees the old and familiar lead chamber doomed to early replacement by a simpler form of plant.

THE PRESENCE OF COPPER IN POWDERED DRUGS AND CHEMICALS.[1]

By E. H. Gane.

From time to time, the author has been somewhat puzzled over the origin of small amounts of copper which have been detected in various powdered drugs and chemicals. Traces of copper have been found by investigators in the ash of various drugs, and have generally been attributed to absorption of copper by the plant from the soil, notwithstanding the fact that the place of growth of the drug may have been far removed from any known source of copper.

That this is not the source of the copper in all cases is shown by the fact that the metal could not be detected in the whole drug, and in the case of chemicals, the process of manufacture precluded copper contamination. As the amount of metal found was extremely small, and its occurrence quite casual, no detailed effort was made for some time to trace the source of the contamination, it being attributed either to careless handling or to the use of copper utensils for transferring the powder from the grinding mill.

The rejection, however, of several consignments of powdered ammonium carbonate, which had developed a blue mottled appearance, rendered it necessary to ascertain definitely the origin of the copper, so as to avoid further trouble from this cause. The search was not without difficulties. Every possible source of copper was eliminated, such as brass work around the mill, and close watch was kept over the grinding and sifting, so as to avoid contamination during these processes. The use of brass sieves and copper or tinned copper scoops was also abandoned in the milling room.

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[1] Reprinted from the *Journal of the Society of Chemical Industry*, February 28 1902. No. 4, Vol. XXI.

In spite of these precautions the same trouble would crop up at intervals, and it was not until attention was drawn to the driving belts that the source of the copper contamination was definitely located.

The various sections of a driving belt are riveted with copper rivets or stitched together with copper wire, and as the leather wears down from constant passage over the pulleys, the rivet heads are gradually raised flush with the surface of the belt, and are slowly ground down by passing over the pulleys, minute particles and sometimes fair-sized fragments of copper being thrown off from time to time.

The casual occurrence of the copper in the powders is easily explicable when the small size of the hopper feeding the mill is taken into account. Replacing the leather belt by one made of rubber has obviated further trouble.

This note is presented in the hope that it may save some manufacturers from similar trouble, and prevent inaccuracies on the part of investigators, particularly when examining the constituents of the ash of vegetable drugs.

PROGRESS OF PHARMACY.

A QUARTERLY REVIEW OF SOME OF THE MORE INTERESTING ADVANCES MADE IN PHARMACY AND MATERIA MEDICA.

By M. I. Wilbert,
Apothecary at the German Hospital, Philadelphia.

Pharmacopœias.—Several of the European Pharmacopœias are being revised, but so far none of them have been definitely announced for publication, and the only advance that is to be reported in this connection is an *Addendum to the Norwegian Pharmacopœia* (third edition, 1895). This addendum includes a total of twenty-three titles, thirteen of these being new drugs, and ten additions to, or alterations in, formulas for galenical preparations. The new admissions are: adeps lanæ cum aqua, albumen ovi siccum, chloretum hydrastinicum, liquor ferri albuminati, methyl sulfonalum, salicylas natriotheobromicus, sapo kalinus, serum antidiphthericum, solutio acetatis kalici, solutio subchloreti ferrici, subgallas bismuthicus, sulfas ferrosus siccatus, tribromphenolas bismuthicus. The changes in the galenical preparations are largely in detail of technique and are comparatively unimportant. (*Apotheker Zeitung.*)

No very valuable additions to pharmaceutical literature are to be recorded of the German commentaries in course of publication. *Hager's Handbuch der Pharmaceutischen Praxis* has been completed and very favorably commented on in the German journals.

During the past three months there have been a number of articles of more or less practical value commenting on the manufacture and use of compressed pills. The direct cause of these articles, especially those that have appeared in the German pharmaceutical journals, was a small book on the subject by F. Utz, Julius Springer (Berlin, 1901). In this book there are upwards of a hundred formulas for the manufacture of various pills, and, as was to be expected, many of them are not as practical or as desirable as they might or should have been. The discussion on these lines has, however, been broadened out considerably and has included the consideration of possible abuses arising from the use of preparations of this kind. The *Pharmaceutical Journal*, London, has also printed a series of articles, dealing largely with the manufacture of this particular class of galenical preparations; many of the formulas given in this series of articles are also rather unpractical, and should be avoided. It would appear that, despite the popularity of this particular class of preparations, comparatively little attention has been paid to their manufacture from a pharmaceutical point of view, or to their efficiency or use on the part of the medical practitioners. Especially is this true of us in this country, where this class of compressed pills, no doubt, originated, and where their manufacture has been and is practically in the hands of the manufacturing pharmacists.

An interesting complication has arisen in Germany in connection with the admission of various synthetic chemicals into the last edition of the Pharmacopœia, under a non-trade-marked name or title, and giving the trade name as a synonym. It appears that several German pharmacists have been under the impression that this matter of synonyms worked both ways, and have, as a consequence, run into trouble with the manufacturers, or, rather, patentees. For instance, a German pharmacist may dispense antipyrine for pyrazalon, but he cannot dispense pyrazalon on a prescription that calls for antipyrine. This, of course, involves a principle of common law, and would hold good in this country as well; so that if anything is to come from the oft-repeated suggestions of admitting these pat-

ented chemicals under a non-trade-marked name, this name must first be popularized, so as to induce medical practitioners to use it instead of the more familiar and usually widely advertised name given by the original manufacturer or the patentee.

There have been a number of reports on original investigations of drugs containing alkaloids. One of the more interesting is an investigation of the *Alkaloids of Tobacco*, by Pictet and Rotchy. (Quoted by the *Apothek. Zeit.*, 1902.) These investigators have isolated three new alkaloids from tobacco. Two of these may be separated from nicotin by fractional distillation, not being as volatile as nicotin. One of these newly discovered alkaloids is a liquid, and named by the investigators *nicotein*; it has the supposed chemical composition of $C_{10}H_{12}N_2$, is volatilized at a temperature of 266° or 267°, and is soluble in water and the usual organic solvents. Another, *nicotellin*, has the composition of $C_{10}H_8N_2$, and requires a heat of more than 300° to vaporize it. At ordinary temperatures it is solid, and by recrystallizing from alcohol may be obtained in the form of white prismatic needles. It is present in tobacco in but small quantities.

The third alkaloid is very volatile and is found mixed with the nicotin. It occurs in very small quantities and has as yet not been satisfactorily studied.

Among changes in the sources of old drugs it is interesting to note that *ginger* is being cultivated in Brazil and also in Central America. A sample of the Brazilian product has reached the European markets, and is said to be particularly firm, light in color, and to have a pleasantly aromatic odor and taste.

According to the *Pharmaceutische Zeitung*, a new process for obtaining *iodine* from seaweeds has been patented in England. According to the specifications of this patent, seaweeds are treated at high temperatures with diluted sulphuric or other mineral acids, and from the resulting liquids iodine may be obtained by various chemical means. The accompanying potassium salts are obtained by crystallizing, and the residue is to be washed, dried, and subsequently used as fertilizer.

The same paper (*Pharmaceutische Zeitung*), in commenting on *sugar of milk*, says that the American product, while inferior to the German, has entered largely into competition, even in the German markets, with the usual result of producing a decided decrease in price.

Amyl salicylate, or salicylic acid amyl ester, while not a very recent preparation, appears to be giving good results as an anti-rheumatic and sedative. It is described as being a colorless, refracting liquid, having an odor somewhat resembling salol, soluble in ether, alcohol and chloroform. It has been used as a substitute for methyl salicylate, applied externally in quantities of 2 or 3 grammes. It has also been given internally in doses of 0·20 six to eight times a day.

Organic combinations of arsenic are increasing at a rate that will soon bring them up to, if not ahead of, the organic salts of silver in number. Among the newer remedies we may mention:

Arrhenal, said to be monomethyl sodium arsenate; this is being brought forward as a substitute for the older sodium cacodylate or dimethyl sodium arsenate.

Neo-arsycodyle, a French preparation, probably analogous to arrhenal.

Atoxyl (*Pharm. Zeit.*, 1902) is a preparation of German origin, and is said to be the anilid of meta arsenic acid. It has been given in doses of from 0·05 to 0·20 subcutaneously.

Magnesium cacodylate has been recommended as being more soluble in water than the corresponding salt of sodium, and also containing a larger percentage of cacodylic acid.

Marsyle, ferric cacodylate, is supposed to be an efficient remedy in cases of neurasthenia, anemia, and various skin diseases, given in doses of 0·01.

Guaiacol cacodylate-cacodiacol has been reported on as being very unstable, being readily decomposed into its constituents.

Glycerino arsenic acid has been suggested as offering a favorable or promising method of administering arsenic; the similarity existing between combinations of phosphorus and arsenic is pointed out, and the possibility of substituting arsenic in the well-known salt of glycerino phosphate of calcium naturally suggests itself. (*L'Union Pharm.*, 1902.)

This proposed glycerino arsenate of calcium has been criticised in some of the German journals, who claim it to be an extremely unstable compound, and consequently not to be depended upon.

Carbolic acid is apparently coming into many new uses; among others the strong acid is being extensively used both in this country as well as in Europe, for washing or swabbing out infected or

broken-down wounds or ulcers. The acid is allowed to act for a few minutes and is then washed away with strong alcohol.

Alcohol has the property of arresting the caustic action of carbolic acid, and on this account is now generally conceded to be the most efficient and desirable antidote in case of poisoning by this drug. Quite a number of cases have been reported in which this antidote has given very satisfactory results. The great number of cases that are constantly being reported, in which carbolic acid has been given or taken, accidentally or otherwise, would warrant the widest possible circulation of the knowledge of an efficient antidote.

A mixture of equal parts of *carbolic acid and camphor* has been recommended as a topical application. It is said to be a bland but efficient antiseptic. Diluted with from three to five parts of olive oil, it has been used as a soothing dressing in burns, eczema, and erysipelas. (*Exchange.*)

A 2 per cent. solution of carbolic acid has been used in the treatment of tetanus, several cases having been reported where apparent favorable results have followed the subcutaneous administration of varying amounts of this 2 per cent. solution.

Crurin.—Quinoline bismuth sulphocyanate, formerly marketed with a 25 per cent. addition of starch, is now also sold without this addition, and has been used, with reported good results, as an injection in cases of gonorrhœa. (*Apothek. Zeit.*, 1902.)

Formaldehyde.—Raikow (*Chem. Zeit.*, 1902) reports having obtained absolute formaldehyde in a liquid state by absorbing the water contained in the commercial 40 per cent. solutions, with potassium carbonate, calcium oxide or calcium chloride. After adding any of these chemicals to saturation and allowing to stand, the mixture separates into two perfectly clear layers that may be separated by mechanical means. The resulting liquid formaldehyde, probably a mixture of various polymeric modifications, is soluble in water, alcohol or ether.

Gluton.—A dietetic gelatine preparation used as a food or as a substitute for albuminous food products, made by treating gelatine with an acid at a comparatively high temperature; neutralize with alkali and dialyse to free from crystallizable salts.

Gelatine treated in this way does not gelatinize, nor is it precipitated by alcohol. Gluton is a white powder that is readily soluble in water, the resulting solution being limpid, even at low tempera-

tures. It is said to have the same food value as gelatine, and may be used in connection with thirst-quenching drinks. (*Phar. Centralhalle.*)

Glyconic acid.—An oxidation product of cane sugar, described as being a thick syrupy liquid that does not reduce Fehling's solution; has been suggested as an available food in cases of diabetes. (*Apothek. Zeit.*)

Glycosal.—Monosalicylic acid glycerin ester; a white crystalline powder melting at about 76° C. Slightly soluble in cold water, more freely soluble in hot water or alcohol, but not readily dissolved by ether or chloroform. Miscible with glycerin, and readily saponified by alkalies or the alkaline carbonates.

Said to possess the antiseptic and antirheumatic properties of salicylic acid, and may be used in place of any of the salicylates to advantage. (*Pharm. Zeit.*, 1902.)

Ichthyol.—Sulphoichthyolate of iron, and sulphoichthyolate of calcium are being recommended for internal use in preference to the more soluble salts of ammonium or sodium, the former having the advantage of being odorless and tasteless.

Ferrichthyol.—The name given to sulphoichthyolate of iron; is to be given in doses of 1·00 or 2·00.

Several substitutes for ichthyol have appeared recently; one of these, ***ichtammon***, being put on the market by F. Reichert, Breslau, is said to be obtained by destructive distillation from a bituminous shale formation. This distillate, subsequently neutralized with NH_3, gives a substance closely resembling ichthyol in physical properties, and its therapeutic value is said to be the equal of ichthyol in every way. (*Pharm. Zeit.*, 1902).

Thigenol.—A sulphonate of soda, said to contain 10 per cent. of sulphur; is freely soluble in water and diluted alcohol; has a slightly alkaline reaction. This compound has also been recommended as a substitute for ichthyol, and is said to be preferable on account of the absence of the disagreeable odor of the latter. (*Apoth. Zeit.*, 1902).

Phenolphtalein.—Also known or sold as purgo, is again mentioned as an efficient and reliable purgative, given in doses of 0·10 to 0·50.

Solvosal-lithium.—Lithium salolo phosphoricum is a powder soluble in 20 parts of water, and recommended to be used as a diuretic in doses of 0·25 three or four times a day. It may also be used

as a local antiseptic or antiseptic mouth-wash in solutions of 1 part of the substance to 200 or 500 of water. (*Pharm. Centralh.*, 1902.)

Sodium bisulphate—$NaHSO_4H_2O$—is said to be useful in modifying water infected with typhoid bacilli, so that it may be drank without fear of infection. When used in the form of compressed tablets containing 0·30 of the bisulphate, one is dissolved in a glass of water, and, in addition to making the water harmless, it will impart an agreeable saline and slightly acid taste, that contributes materially toward quenching the thirst. (*Pharm. Centralh.*, 1902.)

Sodium persulphate and ammonium persulphate have been suggested and used as remedies to stimulate or improve the appetite, given in doses of 0·10 half an hour before eating. In Germany a solution is being sold under the trade name *Persodine;* this (*Pharm. Centralhalle*, 1902) is said to be made as follows:

2. Sodium persulphate.
300. Distilled water. Mix.
Give a tablespoonful half an hour before eating.

Quinine for hypodermic use.—A solution of this alkaloid may be prepared according to Gaglio (*Chem. Zeit.*, 1902) by dissolving 3 grammes of quinine hydrochlorate or hydrobromate and 1·5 grammes of urethan in 3 grammes of distilled water. This combination contains about two molecules of urethan to each molecule of the quinine salt. This of course recalls the fact that there are other chemicals that will form molecular combinations with quinine salts and in this way facilitate solution. Urea was suggested many years ago, and with the reintroduction of this remedy into active use the combination with quinine will probably be found applicable in some cases. Another chemical that appears to combine in a molecular way with some of the quinine salts is chloral hydrate; if we take, for instance, 3 grammes each of quinine hydrochlorate and chloral hydrate, they will readily dissolve in from 3 to 5 grammes of water, making a limpid solution miscible with water to any degree.

Thebaine hydrochlorate has been recommended in cases of neurasthenia, given in doses of 0·05 to 0·20. (*Pharm. Zeit.*)

Among the novelties in the administration of drugs we find *bromo-farina* and *bromo-pan;* the first is said to be flour mixed with a certain amount of a soluble bromide salt and intended for the preparation of the bread or biscuit. Bromo-pan is evidently bread in the form

of a biscuit or roll, each bread containing 1 gramme of a bromide salt. (*Pharm. Centralhalle*, 1902.)

Another proposed novelty is *serum bromatum.* This consists of 6 grammes of sodium bromide and 1·5 of sodium chloride to 1000 of sterilized distilled water. It is said that quantities of 500 or more may be injected without risk or injury, in the same way that normal salt solution is used for transfusion.

Serum iodatum is the corresponding solution of an iodide, but is apparently made up of entirely different proportions. The formula given for this is as follows: Sodium chloride, 6 grammes; sodium iodide, 2 grammes; sodium sulphate, 2 grammes; to 1000 of water. This serum, used as mentioned above, has been tried with success in the treatment of syphilis. (*L'Union Pharm.*, 1902.)

RECENT LITERATURE RELATING TO PHARMACY.

MODIFICATION OF BETTENDORF'S ARSENIC TEST. SOLUBILITY OF STANNOUS CHLORIDE IN ETHYLIC ETHER.

In course of an analysis of an unknown substance, Mr. de Jong, apothecary in Amsterdam, discovered that stannous chloride is soluble in ether.[1] He proceeded to make good use of his discovery in modifying Bettendorf's well-known test on arsenic. As all of us have a more or less troublesome experience with the peculiarities of this test, it seems to be a valuable improvement. Instead of mixing the fluid to be examined with the reagent (no need to go into details) and waiting for a somewhat vaguely defined coloring of the mixture, de Jong overlies the unknown liquid with the acidulated (HCl) ethereal solution of stannous chloride and obtains a contact ring (as in HNO_3 reaction with ferrous salts).

De Jong furnished the final touches on some incomplete literary information. Neither he nor your referent knows of a distinct statement. Credit is due, however, to Roscoë and Schorlemmer, Vol. 3, Part 1, p. 335, where they say: ethylic ether dissolves many inorganic compounds . . . ferric chloride (especially valuable to the apothecary for his tinctura nervina Bestuch), mercuric chloride, platinum chloride, *several* other chlorides. . . . . And on page 337, various metallic chlorides form compounds with ether. One of the

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[1] *Ph. Weekblad*, March 22, 1902.

first of these was obtained by Kuhlmann by bringing together anhydrous ether and stannic chloride. . . . . The *Annalen der Chemie*, Vol. 112, p. 223, and Vol. 114, p. 356, contains articles, by Buckton and by Cahours, on "Zinnmonoethylchlorid, Darstellung, Eigenschaften und Zusammensetzung." Buckton mentions a Zinndiethylchlorid also; but this has only a remote connection to our point. J. B. N.

A NEW METHOD OF DISTINGUISHING HUMAN BLOOD FROM THAT OF ANIMALS.

C. Tarchetti (*Gaz. degli Osped.*, May 19, 1901) describes a new procedure for this purpose: If into an animal (A) the blood of a different species (B) is injected, then after a certain time the blood of the animal (A) is found to be toxic towards blood of the species (B). Thus, by repeated injections into rabbits of human blood—10 c.c. on four or five occasions at intervals of about a week—Uhlenhuth and Wassermann got from the blood of the rabbit a serum which exhibits hemotoxic powers to human blood, not only in a fresh state, but also when dried and redissolved in normal saline solution. Ape's blood was the only other one which behaved like human blood. Wassermann and Schultze proceed thus: Dissolve the spot of blood to be examined in a little normal saline solution; filter; place 4 or 5 c.c. in two small test-tubes, to one of which (*a*) add 0·5 c.c. of rabbit's blood made hemotoxic as above; to the other (*b*) add 0·5 c.c. of normal rabbit's blood. A third control-tube (*c*) may be made with 4 or 5 c.c. of solution of the blood of any animal save ape or man in distilled water. Place the solutions in a thermometer at 37° C.; if the spot of blood be human, in an hour's time the tube (*a*) will show a turbidity or a flocculent precipitate, while (*b*) and (*c*) will be perfectly limpid. Tarchetti carried out similar experiments with human blood and that of animals, both fresh and dried, for more than two months on cloth, wool and knife blades, and found the method reliable. The reaction occurs almost as well at the air temperature as at 37° C. The solutions must be absolutely clear to begin with, and he finds distilled water better for this purpose than normal saline fluid, for it brings all the hemoglobin out of the corpuscles. He has found that the diagnosis can be at once made with the greatest certainty in a hanging drop under the microscope; a slight uniform precipitate is at once

formed, and in a few minutes is seen as islets united in a reticulate pattern, much resembling the arrangement of Ebert's bacillus agglutinated by typhoid serum. The same thing is observed in filtered aqueous solutions of dried blood. It is only after a long time (12 to 24 hours) that a similar appearance is seen in blood of other animals.—*Charlotte Med. Jour.; Pediatrics*, 1902, p. 359.

ARTIFICIAL INFANT FEEDING.

S. A. Visanska (*Pediatrics*, Feb. 15, 1902) says that endeavoring to feed a baby artificially, three important factors are to be borne in mind: First, the quantity of the food; secondly, the quality of the food; thirdly, the individual peculiarities of the child. The writer says that one of the most frequent mistakes made in feeding a baby is that of giving it a much greater quantity of food than it can possibly assimilate, with a result that a child either vomits it or passes it through the bowels in an undigested state.

Regarding the character of food to be given a child, that is its quality, it is evident that the more closely the food resembles mother's milk the more likely it is to agree with the child. The writer says that his experience has taught him that modified cow's milk is the ideal artificial food for feeding infants. He says that the method he has adopted for feeding babies is that of Professor Seibert, and that is to feed according to the weight and not the age of the child. Visanska says that it is of no advantage to have the milk from one cow; it is in fact a distinct disadvantage, for the great difference which exists between milk of different cows makes it impossible to prepare a proper imitation of mother's milk, according to any fixed rules, unless we should have individual cow's milk analyzed in order to determine in just what way the mixture should be made. Besides this, the milk of any cow is subject to variations from time to time, depending upon the nature of the food given it, the health of the animal and other factors.

COFFEE AND TEA AS PRECIPITANTS FOR POISONS.

Dr. Torald Sollmann, Assistant Professor of Pharmacology of the Western Reserve University of Ohio, reports some interesting experiments upon "Coffee and Tea as Precipitants for Poisons." (*The Journal of Medical Research*, January, 1902, 43–53.) After referring to the generally accepted opinion that strong tea and black

coffee are chemical antidotes against alkaloids and metallic poisons, he states that this belief appears to be based solely on clinical experience and upon the fact that both beverages contain some form of tannin, gallotannic acid being known to precipitate both of the above classes of poisons. The clinical results might be due to the physiological effects of the caffeine rather than the chemical action of the tannin, as in the use of coffee in opium poisoning. That the tannin of both tea and coffee should be gallotannic acid seems improbable in the absence of experimental support of this statement (which, apparently, has not been reported), since the different tannins are known to differ widely in composition and reactions. Ordinary tannin—gallotannic acid—is an anhydride of digallic acid.

Tea-tannin may be (Dragendorff, *Pflanzanalyse*, 1882, s. 166) practically identical with gallotannic acid, or with quercotannic acid (Rocheleder quoted in *Beilstein*, 1897, Vol. 3, p. 688), or be an entirely different substance (Stenhase, AMERICAN JOURNAL OF PHARMACY, 1862, p. 254).

Coffee-tannin is radically different from tea-tannin, being a diglycosyl ether, of 3·4 cinnamic acid. The very markedly less astringency of coffee as compared with tea would indicate that the tannins of these two substances were not identical, especially when it is noted that unroasted coffee contains, according to Spencer (G. L. Spencer, "Tea, Coffee and Cocoa Preparations," U. S. Department of Agriculture, Bulletin 13, 1892), from 5·8 to 33·8 per cent. of tannin, while tea contains only from 4·8 to 15·4 per cent., the latter being a very rare figure. Notwithstanding this smaller content in tannin, tea is in practice usually preferred to coffee as a chemical antidote.[1]

In order to determine the chemical reaction of tea and coffee with different alkaloids and metals, and to ascertain how far the general statement of text-books that tannin precipitates "most alkaloids and metals" is true, Dr. Sollmann carried out the following experiments:

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[1] May there not be a larger percentage of tannin in unroasted coffee than in roasted? In other words, do not the destructive changes that take place in green coffee during the process of roasting destroy some of the tannin? As is well known, isolated tannin is markedly affected by heat—swelling, blackening and igniting, according to temperature (U. S. D., 1899, 100)—and green coffee on being roasted is heated to a temperature that is destructive of some of its constituents, including, possibly, some of its tannin.—J. W. E.

"A decoction of coffee was prepared by boiling for forty-five minutes ground, roasted coffee with ten parts of water, replacing from time to time the liquid lost by evaporation, filtering whilst hot, and percolating through the marc and filter enough hot water to make ten parts. A decoction of black 'English Breakfast' tea was made in a precisely similar manner. Both liquids were somewhat acid to litmus. The coffee became somewhat turbid on cooling. The tea showed a very pronounced diffuse precipitate, and became almost opaque in thick layers. This could not be removed by filtration through paper. It could be made to disappear by heating or by the addition of alcohol. On account of this turbidity the reactions were always compared with corresponding dilutions of the decoctions with water. Neither decoction gave any precipitate with dilute hydrochloric acid, nor with Mayer's reagent, in the proportions which were used. The tests were made by adding definite proportions of the decoctions to solutions of the substances to be investigated, and noting the resulting phenomena at once, and after standing. If a turbidity or precipitate occurred, a portion of the unfiltered liquid, in the case of alkaloids, was mixed with about one-fifth volume of 5 per cent. hydrochloric acid, and with one volume of alcohol, to test the solubility. Another portion of the liquid was filtered, and a part of the filtrate was put with more of the decoction. If no further precipitate occurred, a few drops of Mayer's reagent were added. In the case of metallic salts the decoction was added until a further portion ceased to affect the filtrate, and the latter was then tested for the metals. The proportions usually employed for the alkaloids were 2 c.c. of 1 : 100 aqueous solution of the alkaloid[1] to 1 c.c. of the decoction (expressed in the table as 1 : 150—3⅓ per cent.) or 5 c.c. each of 1 : 1000 solution of alkaloid, and of the decoction (expressed as 1 : 2000—5 per cent.)."

Details of the experiments are then given in extenso, after which the conclusions are stated as follows:

I.—*Precipitation of Alkaloids.*—Atropine, coniine, morphine and pyridine are not precipitated even in fairly strong solution by coffee. Tea precipitates them from strong, but not from weak, solutions.

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[1] Or one of its salts, brought into solution if necessary by the addition of a few drops of 5 per cent. H_2SO_4.

Aconitine, brucine, cocaine, lobeline, nicotine and pilocarpine, in weak solution, are only sparingly precipitated by tea; coffee does not affect them even when they are in concentrated solutions.

Apomorphine, the cinchona alkaloids, hydrastinine, strychnine, and veratrine in dilute solutions are precipitated efficiently by either coffee or tea, the latter being generally more efficient, except perhaps for veratrine and quinine.

The precipitation is incomplete with all alkaloids except apomorphine. However, the quantity of unprecipitable alkaloid is quite small in those which are said to precipitate from "dilute solution," since most of the alkaloid is removed from 1 : 2000 solutions.

The precipitates are somewhat soluble in dilute HCl, very readily soluble in dilute alcohol. The administration of the latter must therefore be avoided if these beverages (or tannin) are used as chemical antidotes in alkaloidal poisoning. Since the precipitates are not quite insoluble in water, as little liquid as possible should be given. The quantities of the decoctions should not be less than 3 c.c. of a well-boiled 10 per cent. decoction for each milligram of alkaloid.

II.—*Metallic Salts*[1].—Tea is also the more efficient precipitant of metals, but the difference is not nearly so striking as with alkaloids. Both beverages are inefficient against arsenious acid or tartar emetic. They precipitate to a large extent, but not quite completely, the salts of cobalt, copper, nickel, uranium and zinc, and would be useful antidotes against the toxic members of this list. They precipitate practically completely the salts of aluminum, lead and silver. Mercury is partly precipitated by tea, but not by coffee, so that the former would be an antidote, the latter not.

III.—*Proteids* (*Eggwhite, Albumose and Gelatine*).—These differentiate very sharply between the two tannins; whereas tea produces large precipitates, coffee leaves them unaffected, or renders them slightly turbid at most. This serves to explain the less astringent taste of coffee and its less deleterious effect upon digestion.

The reactions of tea bear a very close resemblance to those of gallotannic and quercotannic acid. The precipitant effects of caffeo-

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[1] The salts used were: Arsenious acid, tartar emetic, cobalt chloride, cupric sulphate, nickel sulphate, uranium acetate, zinc sulphate, ferric chloride, lead nitrate, silver nitrate, aluminum chloride and mercuric chloride.

tannic acid are weaker, but occur along the same lines. The greatest differences are seen in their action on proteids and on certain alkaloids, whereas other alkaloids and most metallic salts are precipitated almost equally well by both. An exception is formed by mercuric chloride, which is partly precipitated by tea, not at all by coffee.

J. W. ENGLAND.

CORRESPONDENCE.

BOTANICAL NOMENCLATURE.

MAY 1, 1902.

DEAR SIR :—Replying to your request of April 23d, asking me for my views on "Botanical Nomenclature," I take pleasure in giving them. As is well known to readers of my publication, "Mycological Notes," my views on the subject are very radical. I advocate strongly the discontinuance in current literature of the use of personal names after the names of plants. I believe that the custom of citing personal names is conducive to more harm, more confusion, more synonyms, more invalid "new species," more changing of old names, than all other agencies combined. It is not denied by any one that the various names we have for a plant, synonyms, are both a great weight and a great hindrance to the science. Botanists meet and pass rules for the naming of plants, but they cannot agree on any set of rules, and never will as long as the members are vitally interested in the particular rules that perpetuate their own names and the plant names that have been proposed by themselves.

Botanical nomenclature is, theoretically at least, a language, and should reach stability by custom and good usage, and by that alone it will do so. Can we expect stability, when we offer a standing reward by which the man who wishes a change in a plant's name has his own name cited thereafter in connection with it? If this be not the cause of much name changing, it is no less a fact that under such a system, synonyms have reached their present unwieldy bulk and are growing every day, and I believe will increase to the end of all time, under present methods.

As long as a new combination, some "prior" generic name, some "prior" specific name, some slight variation in shape of leaf or bract or even color of anther, stands as a reward by which some men can cite their own names as authority for a new species, instead

of those of another man, trivial excuses for such acts will be found. It is no less justice to the men who are not afflicted with such a craving to conspicuity, than to prevent injustice, that the change of method be made.

There can be no denying the fact that a binominal, a combination of the generic and specific names, is the *name* of a *plant*, and that this alone is the name of the plant. If relieved of artificial inducements for changes, these binominals will gradually assume practical uniformity. It is a language, and by custom and use must reach stability, like any other language. What constitutes "good language" but accepted usage? If botanical writers were interested only in using good botanical language, they would select established names most generally in use by qualified men, for that is "good language," and gradually it would crystallize in reasonably permanent form.

It would, of course, change gradually; all languages change gradually, but we would be relieved of these "volcanic eruptions," overthrowing most of our names, simply because certain writers have peculiar views of "priority," that for one reason or another afford excuse to propose new combinations. But one might say, we must have some authority for our names. And so we must, and fortunately we have, and a good one, the "Index Kewensis." This work is modern; it should be accepted as a *dictionary* of botanical language, the same as we do with standard dictionaries of the English language. Let us use names of plants only as authorized in such works, in dictionaries of the language, and abolish personal names from all writings devoted to plants, such as manuals, journal articles, pharmacopœias, etc. Gradually, botanical nomenclature will then take on the dignity and permanency of a language.

Neither chemists, physicians nor pharmacists are interested in the different views of classification or nomenclature of the various schools of botanists or individual writers. Let the botanists fight that problem out among themselves. The authors of such works as "Index Kewensis" alone are called on to decide which view presents enough merit to warrant adoption. I strongly advocate the adoption of the names for the plants adopted in the "Index Kewensis," and the exclusion of all personal names after the names of plants.

Sincerely yours,

C. G. LLOYD.

Cincinnati, O.

EDITORIAL.

THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The attainment of the fiftieth anniversary usually furnishes an occasion for congratulation, whether it be by a nation, a state, an association or an individual. As we watch the careers of individuals with interest, so with organizations and societies, we not only contemplate their immediate aims and purposes, but ask ourselves what they will stand for in years to come. And if they have stood the test of years, we are warranted in concluding that their endurance was due to some inherent force or underlying principle of action that received not only the support of the individual members but was approved by the highest and best sentiment of the time. That the American Pharmaceutical Association has stood this test stands to the credit of American pharmacy.

The American Pharmaceutical Association began its history on a plane that was intended to benefit the pharmacists of America for all time. How much the practice of pharmacy has drifted from, and how much it has been guided by, those cardinal principles as contained in the earlier Proceedings of the Association would require a master hand to treat with justice. Suffice it to say that this Association has enrolled in its membership every one of those master minds who have contributed so much to the elevation of American pharmacy. Beginning with the names of men like Procter, we find extending down to our own time men of the character of Squibb and Rice. Verily there is in the Proceedings of the Association a hall of fame with its immortals that we leave to others to treat at the time of the celebration of the golden anniversary by the Association on September 8th. If only something could be done to reach the rank and file of the pharmacists of America, to enthuse them with the spirit of the founders of this Association, and to show them that this spirit is still manifest in the work, we cannot but believe that there are many who are not members now who would become affiliated with the organization.

Since the organization of the Association in 1851 and 1852 the world has made greater advances—particularly in science—than in the thousand years preceding. Pharmacy and medicine each have profited by the advances of the sciences, and while we may well be discouraged with the condition of pharmacy in some quarters we

will find that this was also the complaint fifty years ago. A more hopeful view of the progress in American pharmacy will be had by reading the earlier Proceedings and comparing them with those of the past few years. Or, better still, we may say to those who have never attended the meetings of the Association—or who have never become enthused with its merits—that this next meeting in September will be an unusual opportunity for securing an historical knowledge of the Association as well as its purposes and conduct.

The President of the Association, as well as the Local Secretary, are active in their preparations for the meeting. The Local Secretary, Wm. L. Cliffe, has acted in accordance with a resolution adopted at the St. Louis meeting, September 21, 1901, and named a committee on arrangements for the meeting of 1902. The following are the members: Howard B. French, Harry L. Stiles, Joseph P. Remington, Clement B. Lowe, Mahlon N. Kline, Henry K. Mulford, Miers Busch, Richard V. Mattison, Walter A. Rumsey, Henry C. Blair, 3d; Geo. D. Rosengarten, Wm. A. Sailer, Walter V. Smith, Harvey H. Hentzer, D. E. Bransome, Jacob M. Baer. Mr. Cliffe is chairman of the committee.

THE MEMORIAL TO DR. CHARLES RICE.

We have already referred in this JOURNAL (pp. 44 and 148) to the movement inaugurated by the Board of Trustees and Committee of Revision of the United States Pharmacopœia for the purpose of erecting a monument over the grave of the late Dr. Charles Rice and of preparing a memorial volume commemorating his life and work. The committee cannot proceed in either one of these directions until sufficient funds have been raised.

While the Committee of Revision have taken the initiative in this movement, it is but natural to suppose, when we contemplate the life of him who with rare genius and unselfishness contributed so much to the success of the U.S.P. for three revisions that others should wish to join in the work of honoring his name. The pharmacists of the United States are therefore not only given an opportunity to co-operate in this movement but they are especially invited to do so. A number of drug journals have taken up the matter and have raised a considerable sum of money. The Committee on Rice Memorial "invite all to contribute to this fund."

If there has been any hesitancy on the part of any to contribute to this fund we cannot but believe that it has been due to a misconception as to the nature of the movement or where the contributions should be sent. We hope that all who desire to contribute to this fund will remit promptly, so that the work of the committee may be carried on without further delay.

All contributions should be sent to either Prof. Virgil Coblentz, 115 West Sixty-eighth Street, New York City, N. Y., or to S. A. D. Sheppard, 1129 Washington Street, Boston, Mass.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

A Laboratory Manual of Urinary Analysis. By Robert A. Hatcher, Professor of Materia Medica and Director of the Laboratory of Urinary Analysis, in the Cleveland School of Pharmacy; Demonstrator of Pharmacology in the Medical Department of Western Reserve University. 1902.

The object of the present work has been to prepare a manual which will give concise but sufficient directions for the examination of urine for clinical purposes. It may be compared to a good notebook recording thorough work or an abridged dictionary for ready reference. The work includes a treatment of the microscopical examination of the urinary sediments, as well as qualitative and quantitative chemical tests. The whole work is included in forty pages and ought to encourage the interest of both physicians and pharmacists in a work of this character, which can be performed so readily and is so valuable in the diagnosis of disease.

Revue des Medicaments Nouveaux et de Quelques Medications Nouvelles. Par C. Crinon. 9e édition. Revue et augmentée, Paris: Rueff et Cie, Editeurs, 106, Boulevard Saint-Germain, 106. 1902.

This work of Crinon's is quite well known, it having passed to the ninth edition. It includes many of the newer medicaments, as acetopyrine, agurine, gacamphol (camphorate of guaiacol), arsitriol (glycero-arseniate of lime), marsitriol (glycero-arseniate of iron), hermophenyl (mercury-phenyldisulfonate of sodium), honthin, iodipine, lecithine (phospholutéine), purgatol (purgatine), suc musculaire

(myoserum), tetranitrol (tetranitrate of erythrite) and vasoliments. Under many of the medicaments is given information concerning their preparation, properties, therapeutics, pharmacology and doses. The work is well done and will be appreciated, especially on account of the treatment of the glycero-phosphates and allied compounds.

PHARMACEUTICAL MEETING.

The last of the series of Pharmaceutical Meetings of the Philadelphia College of Pharmacy for 1901–1902 was held on Tuesday, May 20th. Mr. Wallace Procter, a member of the Board of Trustees, presided.

The first paper announced on the program was on "The New Contact Method for the Manufacture of Sulphuric Acid," by Prof. Samuel P. Sadtler (see page 285), in which he referred to the reactions involved in the lead chamber process, and said that in this new process the reactions are fundamentally the same, the principal difference in the process being that the gaseous carrier of oxygen is replaced by a solid contact material, which by its catalytic action changes the sulphur dioxide to the trioxide.

The next paper was on "The History and Commerce of Coffee," by William B. Marshall, formerly Curator of the Philadelphia Commercial Museums. In the discussion which followed the reading of this paper Dr. Miller said that perhaps the Mohammedans were the most inveterate drinkers of coffee, and that they simply added hot water to the pounded and roasted coffee, and then drank dregs and all. He said that Mohammed forbade the use of alcoholic stimulants of any kind, and while his teachings are not strictly followed by the higher classes, still the Bedouins and lower classes are still abstemious in their habits. Some of them have taken kindly to coffee, hashish and opium, and of these coffee seems to be the least harmful, although when first introduced it was placed under a religious ban.

Dr. Lowe said that while coffee could not be looked upon as a food, it was a stimulant of considerable advantage, and that he thought the better it was clarified the less harmful it was. Mr. Marshall further said that few people could be said to be addicted to the coffee habit as to alcoholic stimulants, and that among life insurance companies the use of coffee was not given any consideration except

possibly where there are certain derangements of the liver, when the applicant is advised against its use. He furthermore said that in Turkey and in France the coffee was very black, and that perhaps it had been colored with graphite, although he had no positive information on this subject. Dr. Miller furthur said that a few years ago there was a considerable demand for whole flaxseed, the mucilage of which was extracted and used for varnishing coffee. Mr. Procter said that he understood that smaller quantities of stronger decoctions were used in foreign countries than here, which statement was borne out in the remarks made by Mr. Marshall.

The next paper was on "Some Observations on a Recent Trip to the Madeira Islands," by Dr. Adolph W. Miller. The speaker stated that the name Madeira in Portuguese means wood, and the name was given on account of the dense forests which covered the islands when they were discovered. In referring to the several industries, he said that while the island was famous for its wine production, owing to the ravages of the Oidium and Phylloxera, the quantity was becoming considerably reduced each year. The soil is quite fertile, but owing to the mountainous character of the country irrigation is practiced. Dr. Miller referred to the enormous proportions of many of the commoner garden plants. The common geranium (*Pelargonium roseum*) attained the height of 5 to 6 feet; *Euphorbia Poinsettia*, 15 feet; *Ricinus communis*, 25 feet; fuchsias, 6 feet; flowers of callas, 12 inches in diameter; begonias, 6 feet. Among the interesting plants noted were Bougainvilleas, *Acacia farenisiana*, *Datura Bruganansii*, *Lagostrœmia Indica*, *Opuntia Tuna*, *Clethra arborea*, etc. Over seven hundred species, representing nearly four hundred genera, are found on the island. Dr. Miller said that the climate was specially adapted to those suffering from lung trouble, and that it was largely visited by Europeans.

M. I. Wilbert, in a paper on the "Progress of Pharmacy," called attention to some of the more interesting advances recently made in pharmacy and materia medica (see page 290). He also exhibited specimens of the following: (1) Carbolic acid and camphor; (2) aqueous solutions of quinine hydrochlorate with urethan or chloral hydrate, both of which are employed hypodermically. Mr. Wilbert also called special attention to the newer arsenic preparations.

A special vote of thanks was tendered the speakers of the afternoon for their valuable papers.

W. S. Weakley sent a specimen of so-called *pure* ground flaxseed accompanied with the following notes: "The specimen contains the following materials: corn meal, wheat middlings, ground meal cake, paraffin oil in excess and a slight amount of adhering flaxseed oil. Enclosed find specimen of oil (benzin extractive) and exhausted meal showing yellowish particles of corn. After having made a qualitative examination of this sample it occurred to me that it might be interesting to see as to just what extent some wholesale houses were selling adulterated ground flaxseed, so I obtained three samples from various wholesale houses. Upon examination I obtained the following results:

"No. 1. Color in general about normal; upon closer examination yellow particles of corn were observed; the odor was quite different from that of a pure ground seed; oil found in excess. Microscopical examination revealed large quantities of corn and wheat starch, together with the characteristic cellular structure of corn and wheat. Upon being heated with glycerin the characteristic odor of roasting corn was observed The oils extracted by benzin were found to be a mixture of flaxseed and paraffin.

"No. 2. Corresponded to above analysis excepting the presence of a slightly larger percentage of oil.

"No. 3. Color lighter than samples 1 and 2; presence of corn meal demonstrated both macroscopically and microscopically; the lighter color being due to the smaller amount of oil present, which seemed to be pure flaxseed oil."

Charles C. Drueding exhibited a number of specimens of chamois skins, including both the genuine chamois skin and the oil-tanned sheep skin. Mr. Procter, in commenting on the exhibit, spoke of the quality of the skins, and said that the gray skins were introduced some twelve or fifteen years ago by Drueding Brothers. Dr. Miller said that he thought the specimens were of considerable intrinsic value. Professor Kraemer announced that Mr. Drueding desired to donate the collection to the College and moved that a special vote of thanks be tendered him, which motion was unanimously adopted.

The chairman spoke of the success attending the present series of pharmaceutical meetings, and thereupon a vote of thanks was tendered the committee having them in charge for their work.

H. K.